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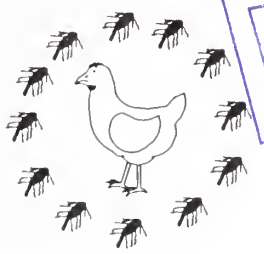
Poultry Food Assess Risk Model (Poultry FARM) Version 2.0



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INTRODUCTION

The Poultry Food Assess Risk Model (Poultry FARM) is a collection of computer spreadsheet models that predict the exposure and response of consumers to human bacterial pathogens of poultry origin. Version 2.0 of Poultry FARM contains one simulation model and four predictive models. The models are incorporated into Excel notebooks and the simulation model requires @Risk (Palisade Corp., 31 Decker Road, Newfield, NY, 14867; 800-432-7475) to run. The primary goal of Poultry FARM is to provide poultry companies and regulatory agencies with computer models that assist them in making food safety decisions that impact public health.

SIMULATION MODEL

Is a packaging to consumption model that assesses the risk and severity of *Salmonella* spp. and *Campylobacter jejuni* infections from chicken. The model predicts the change in *Salmonella* spp. and *C. jejuni* load of 100,000 servings of chicken as they move from packaging at the processing plant to consumption. In addition, the model predicts the cases of adverse health outcomes (i.e., infection, sick, doctor, hospital, chronic sequelae, and death) per 100,000 servings. Finally, the model calculates a severity value that summarizes the overall public health impact of the chicken.

Operating Instructions:

1. Start @Risk.
2. Open "Simulate.xls" of Poultry FARM.
3. Click on the "Model" spreadsheet tab.
4. Highlight cells C3:C9 (i.e., output cells for *Salmonella* spp.).
5. Click on the "Add Outputs" button of @Risk.
6. Highlight cells C20:C26 (i.e., output cells for *C. jejuni*).
7. Click on the "Add Outputs" button of @Risk.
8. Enter input settings (i.e., red numbers).
9. Click on the "Simulation Settings" button of @Risk.
10. Enter 100,000 iterations (i.e., servings).
11. Click on the "Simulate" button of @Risk.
12. Copy and paste "Summary Statistics" into cell A1 of the "Data" spreadsheet.
13. View results in the "Results", "EA", and "HOA" spreadsheets.

References:

1. Oscar, T. P. 1997. Predictive modeling for risk assessment of microbial hazards. Reciprocal Meat Conference Proceedings, American Meat Science Association, 50, 98-103.

2. Oscar, T. P. 1997. Use of computer simulation modeling to predict the microbiological safety of chicken. Proceedings of the 32nd National Meeting of Poultry Health and Processing, Delmarva Poultry Industry, Inc., p. 73-83.

3. Oscar, T. P. 1998. The development of a risk assessment model for use in the poultry industry. J. Food Safety *18*, 371-381.

4. Oscar, T. P. 1999. USDA, ARS Poultry Food Assess Risk Model (Poultry FARM). 34th National Meeting on Poultry Health & Processing, Delmarva Poultry Industry, Inc., p. 96-106.

PREDICTIVE MODELS

Are mathematical equations that predict growth (i.e., lag time, specific growth rate, and log cycle increase) of *Salmonella* spp. in broth culture or on sterile chicken as a function of time and temperature.

Model 96D

Predicts growth of *Salmonella* Typhimurium in brain heart infusion broth as a function of previous growth pH (5.5 to 8.5), temperature (15 to 40°C), and pH (5 to 7).

Model 97B

Predicts growth of *Salmonella* Typhimurium on sterile ground chicken breast burgers and sterile ground chicken thigh burgers as a function of previous growth temperature (16 to 34°C) and temperature (16 to 34°C).

Model 98A

Predicts growth of *Salmonella* Typhimurium on sterile ground chicken breast burgers as a function of previous sodium chloride (0.5 to 4.5%) and temperature (10 to 40°C).

Model 99C

Predicts growth of *Salmonella* Typhimurium on sterile ground chicken breast burgers as a function of temperature (8 to 48°C).

Operating Instructions

1. Open "Predict.xls" of Poultry FARM.
2. See "Index" spreadsheet for a list of models.
3. Select a model by clicking on the appropriate spreadsheet tab.
4. Enter values for model parameters (i.e., red numbers).
5. Model automatically calculates growth characteristics (i.e., blue numbers).

References:

1. Oscar, T. P. 1998. Growth kinetics of *Salmonella* isolates in a laboratory medium as affected by isolate and holding temperature. J. Food Prot. *61*, 964-968.

2. Oscar, T. P. 1999. Response surface models for effects of temperature, pH, and previous growth pH on growth kinetics of *Salmonella* Typhimurium in brain heart infusion broth. J. Food Prot. *62*, 106-111.

3. Oscar, T. P. 1999. Response surface models for effects of temperature and previous temperature on lag time and specific growth rate of *Salmonella* Typhimurium on cooked ground chicken breast. J. Food Prot. *62*, 1111-1114.

4. Oscar, T. P. 1999. Response surface models for effects of temperature and previous growth sodium chloride on growth kinetics of *Salmonella* Typhimurium on cooked chicken breast. J. Food Prot. *in press*.

If you have any questions or suggestions regarding Poultry FARM or if you would like a copy of any of the listed references, please do not hesitate to contact me.

Sincerely,

Thomas P. Oscar

DISCLAIMER

Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.